## REMARKS

Applicant wishes to correct paragraph 1 of the Office Action issued on May 21, 2003. The Office Action erroneously states that a request for a Continued Prosecution Application (CPA) was filed pursuant to 37 CFR § 1.53(d) on February 12, 2003. The actual filing made on that date was a Request for Continued Examination (RCE) pursuant to 37 CFR § 1.114. Applicant requests that a correction to paragraph 1 of the Office Action be issued to reflect the proper filing process. If copies of the correct, RCE, filing are required in support of this request, please contact Applicant's representative.

In the Office Action, claims 1, 6, and 7 were rejected under 35 U.S.C. § 102(b) for being anticipated by Lyman, U.S. Patent No. 3,860,300 ("Lyman"). Applicant traverses the rejection and submits that Lyman does not and cannot anticipate the present invention because Lyman does not read of each and every element in the pending claims.

To anticipate a claim, each and every element of that claim must be found, either expressly or inherently described, in a single prior art reference. See *Verdegaal Bros. v. Union Oil Co.*, 2 USPQ2d 1051 (Fed. Cir. 1987). Applicant submits that no elements of the pending claims are found in Lyman and, thus, Lyman does not anticipate the present invention.

Lyman discloses a magnetic suspension apparatus for supporting an object that is unstable along the longitudinal axis of said object. The apparatus consists of two independent systems - one using permanent magnets attached at the ends of the object and one using electromagnets. (See col. 6, lines 15-19). The permanent magnets (reference numbers 26, 27) attached to the ends of the suspended object are acted upon by permanent magnets (14, 15) affixed to the suspending equipment. (See cols. 2-3, lines 66-3). However, the permanent magnetic arrangement may not be sufficient to maintain the suspended object in an axially static

state. (See col. 3, lines 3-12). Accordingly, electromagnets (12, 13) are employed to place and, if necessary, maintain the suspended object in an axially stable state. (See col. 3, lines 16-18). Electromagnets 12, 13 are regulated by a servo mechanism that includes a rate component and a displacement component to measure the amount and rate of axial displacement of the suspended object. (See cols. 4-5, lines 66-5). The rate component uses a coil (32) in cooperation with a permanent magnet (27); as the permanent magnet (27) moves axially relative to the coil (32), a change in magnetic flux is indicated by coil (32). (See col. 5, lines 35-38). The change in magnetic flux may be used to determine the rate at which the suspended object is moving axially. (See col. 5, lines 38-43). The displacement component comprises a light source (34), a shield (35) attached to an end of the suspended object and photocells (36-36). (See cols. 4-5, lines 66-6). As the suspended object moves axially, the shield (35) screens less of the light (34) from the photocells (36-36). (See id., Fig. 1). The amount of light received by the photocells may be translated into the amount of longitudinal movement experienced by the suspended object. (See id.) In one embodiment, the permanent magnets (26, 27) and the electromagnets (12, 13) are combined into a single unit (64) having a permanent magnet (66) and an electromagnet (67, 68). (See col. 5, lines 59-67) However, the use of the combined unit (64) is still confined to regulating the longitudinal movement of the suspended object. (See claims 1-5).

In substantial contrast, the present invention is a rotor spinning device that comprises a contactless, <u>passive radial bearing</u> for seating a spinning rotor shaft, and a damping device for damping <u>radially directed oscillations</u> of the spinning rotor shaft. The passive radial bearing comprises a permanent magnetic element fixedly attached to the rotor shaft such that the magnetic element rotates with the shaft (Fig. 3, reference 8; page 6, lines 13-15), and a stationary permanent magnet disposed in magnetic proximity to the rotating magnetic element for seating

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the spinning rotor shaft (Fig. 3, reference 19; page 6, lines 15-17). The radial bearing is called "passive" because neither the stationary magnet nor the rotating magnetic element are actively controlled. The damping device comprises electromagnet elements arranged radially around the shaft of the spinning rotor such that the electromagnets act upon the permanent magnets attached to the shaft to dampen radial oscillations during rotation of the shaft (Figs. 3, 4, 5; page 6, lines 17-31). A control system comprising a sensor device and a control device monitors the spinning shaft for radial oscillations and provides power to the electromagnetic elements as needed to dampen the oscillations. The sensor device comprises sensor elements arranged radially around the shaft.

Applicant submits that Lyman does not anticipate the present invention because Lyman does not read on each and every element of the pending claims. Lyman does not describe any radial bearings, as the term is defined, i.e., Lyman does not teach any bearings in which the direction of action of the load transmitted is radial to the longitudinal axis of the shaft. Nor does Lyman teach the use of electromagnetic elements to dampen the <u>radial oscillation</u> of a spinning rotor shaft. Lyman only teaches the monitoring and regulation of <u>longitudinal movements</u> of a suspended object. The present invention teaches that the permanent magnets attached to the shaft, and acted upon by the electromagnetic elements, are also part of the passive radial bearings. Lyman expressly teaches two independent magnetic systems for controlling longitudinal movement of a suspended body - one consisting of permanent magnets and one using electromagnets. Further, the electromagnetic elements of Lyman do not act upon any elements of a radial bearing as Lyman does not disclose radial bearings. Finally, the control system of Lyman only monitors longitudinal movement of the suspending object and, hence, does not read on the control system of the present invention. Thus, Lyman fails to read on each

and every element of the present invention as disclosed in the current application and, hence, Lyman cannot anticipate the present invention. Accordingly, Applicant requests reconsideration and withdrawal of the rejection of claims 1, 6 and 7.

On page 3 of the Office Action, claims 2-5 were rejected under 35 U.S.C. § 103(a) for being unpatentable over Lyman in view of Nakazeki, et al., U.S. Patent No. 4,686,404 ("Nakazeki"). Specifically, the Examiner has taken the position that Lyman teaches all of the limitation of the claimed invention except for the sensor device at the active site but that Nakazeki discloses such a sensor device. The Examiner concludes that it would have been obvious to include the sensor device as taught by Nakazeki with Lyman to achieve the present invention. Applicant traverses the rejection for the reasons discussed below.

Firstly, Applicant directs the Examiner's attention to the fact that no independent claim was included in the obviousness rejection; only claims depending from independent claim 1 were rejected. Applicant submits that this is an improper rejection as claims depending from a patentable independent claim are themselves patentable. As claim 1 is apparently patentable over Lyman in view of Nakazeki, then claims 2-5 are also patentable over the cited references. Nevertheless, endeavoring to place the application in a condition of allowance, Applicant provides the following response to the rejection.

When establishing an obviousness rejection, the following criteria must be met: 1) there must be some suggestion or motivation, in the prior art or in the knowledge generally available to one with ordinary skill in the art, to modify the prior art or combine the prior art references; 2) there must be a reasonable expectation of success in modifying the prior art; and 3) the prior art must teach or suggest all of the claimed elements. In re Vaeck, 947 F.2d 448 (Fed. Cir.

1991). Taking the above criteria individually, it becomes clear that the references cited in the Office Action cannot render the present invention obvious.

As discussed above, Lyman discloses a magnetic suspension apparatus for supporting an object that is unstable along the longitudinal axis of said object. The apparatus consists of two independent systems - one using permanent magnets attached at or near the ends of the object and one using electromagnets. Nothing in Lyman suggests using the magnetic suspension apparatus to control radial oscillations of a spinning rotor shaft seated in a stable manner in contactless, passive radial bearings. Indeed, Lyman fails to disclose radial bearings of any kind.

Nakazeki teaches a radial magnetic bearing device that is actively controlled to control shaft displacement caused by the gyroscopic effect of precession (col. 1, lines 49-53, claim 1). As discussed in Nakazeki, precession and radial oscillations are two completely different modes of undesired movement of a spinning apparatus (col. 1, lines 37-41, Fig. 2). The radial bearing in Nakazeki consists only of stationary electromagnetic elements (the rotating magnetic element is eliminated in favor of a magnetizable shaft) (col. 3, lines 6-11). The displacement of the shaft is measured and the output of the electromagnet elements of the stationary magnetic portion is adjusted to prevent the precession of the shaft (col. 3, lines 21-27, col. 4, lines 59-60). Nakazeki does not teach a passive radial bearing, nor does Nakazeki teach a damping device separate from the actively controlled radial bearing disclosed in Nakazeki. Indeed, because the radial bearing in Nakazeki is actively controlled, there is no need for a damping device separate from the radial bearing.

Regarding the first of the criteria - the existence of some suggestion or motivation to combine the prior art references - Applicant submits that the cited references teach away from each other such that one of ordinary skill in the art would not be motivated to combine the

references. Lyman teaches two independent systems to maintain an axially unstable suspended object at an axially neutral position, the systems arranged in such a manner as to require nearly zero power to maintain the suspended object. Nakazeki teaches an actively controlled system employing electromagnets that are constantly powered to regulate precession of a spinning object. To combine Nakazeki with Lyman destroys the purpose of Lyman, i.e., the minimization of power consumption. (See Lyman, col. 2, lines 18-20, col. 6, lines 43-55, Claims 1-5). In addition, Nakazeki teaches the use of a thrust bearing to control the axial movement of the spinning apparatus (col. 3, lines 12-14) and, hence, there is no need to combine the cited references. Finally, there is no suggestion to combine the cited references to control the radial oscillations of a suspended object because neither Lyman nor Nakazeki teach or suggest controlling radial oscillations of any kind, much less of a spinning shaft seated in a stable manner in a passive radial bearing. Thus, the combination of Lyman and Nakazeki fails to satisfy the first criterion.

Regarding the second of the criteria, Applicant submits that the cited references fail to provide a reasonable expectation of success in combining. Lyman teaches maintaining an axially unstable suspended object at a neutral position relative to the object's longitudinal axis. Nakazeki teaches using electromagnets to prevent the precession of a spinning object. Neither Lyman nor Nakazeki provides any motivation to combine. Nor would one of ordinary skill in the art have any expectation, reasonable or otherwise, that such a combination would be successful. Nothing in Lyman or Nakazeki suggests that combining a system for maintaining a suspended object at an axially neutral position with an actively controlled electromagnetic radial bearing would successfully result in the present invention - a damping system operating on a

passive radial bearing made of permanent magnets. Thus, the combination of cited references fails to satisfy the second criterion.

Finally, the combination of Lyman and Nakazeki fails to teach every element of the present invention - the third of the criteria. As discussed in detail above, Lyman fails to teach any of the elements of the present invention. Lyman does not teach the use of a passive radial bearing for stable seating of a spinning rotor or the use of electromagnets acting upon permanent magnets attached to the spinning rotor to control radial oscillations. All Lyman teaches is the use of permanent magnets and electromagnets to control the axial position of an unstable suspended object. Nakazeki only teaches the use of actively controlled radial bearings made of stationary electromagnets acting upon a magnetizable shaft. Neither Lyman nor Nakazeki teach the use of a passive radial bearing made of permanent magnets attached to the shaft and stationary permanent magnets acting thereupon; and the application of electromagnets to the permanent magnets attached to the shaft to control radial oscillations. Thus, the combination of cited references fails to satisfy the third criterion.

As the combination of Lyman and Nakazeki fails to satisfy any of the three criteria for establishing obviousness, Applicant submits that the combination cannot render the present invention obvious. Applicant requests reconsideration and withdrawal of the rejection of claims 2-5.

In view of the foregoing, it is respectfully urged that the present claims are in condition for allowance. An early notice to this effect is earnestly solicited. Should there be any questions



Received from < 7043317598 > at 7/11/03 11:42:04 AM [Eastern Daylight Time]

regarding this application, the Examiner is invited to contact the undersigned at the number shown below.

Respectfully submitted,

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